Remarks

Entry of the amendments, reconsideration of the application, as amended, and allowance of all pending claims are respectfully requested. Claims 1, 5-10, 14-18, 20, and 24-28 remain pending.

With the above amendments, applicants are distinctly claiming and particularly pointing out one or more features of their invention. These claim amendments are being provided to clarify applicants' invention and not in acquiescence to the rejections. Support for the amendments may be found throughout applicants' specification including, for instance, paragraphs 18-20, 26, 32-35 and 42. Therefore, no new matter has been added.

In the Office Action, dated October 14, 2010, the specification is objected to as failing to provide proper antecedent basis for the claimed subject matter (i.e., storage medium of claim 20); and because paragraphs [0021], [0029] and [0032] contain an embedded hyperlink and/or other form of browser-executable code. Without acquiescing to these objections, applicants have amended claim 20 replacing storage medium with storage device, which is described in paragraph 42 of applicants' specification, and have removed the embedded hyperlinks. Therefore applicants respectfully request withdrawal of the objections.

Further, claims 1, 5-6, 10, 14-15, 20 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ota et al. (U.S. Patent No. 7,162,617) in view of Bond et al. (U.S. Patent No. 7,574,346); and claims 7-9, 16-18 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ota et al. and Bond et al., and further in view of Michaelis (U.S. Patent No. 7,5189,800). Applicants respectfully, but most strenuously, traverse these rejections to any extent deemed applicable to the amended claims.

In accordance with one or more aspects of applicants' invention, unutilized compute power is harnessed, which provides immediate economic benefits to an organization that has a large installed base of nodes. For instance, a heterogeneous computing environment is provided that has a plurality of nodes: one or more of which has a native architecture, but also supports one or more non-native architectures. When a request is received by a resource

manager to be processed by the heterogeneous computing environment, a determination is made as to which of the nodes of the heterogeneous computing environment have a native architecture that is compatible with the request to be processed or support a non-native architecture that can process the request. Then, from those nodes that either have a native architecture or support a non-native architecture compatible with the request, one or more nodes is selected to process the request.

In one particular example, applicants claim a method of facilitating allocation of resources in a heterogeneous computing environment having a plurality of nodes (e.g., independent claim 1). The method includes, for instance, obtaining, by a resource manager executing on a processor of the heterogeneous computing environment, one or more attributes of at least one node of the heterogeneous computing environment, the at least one node having a native architecture and supporting one or more non-native architectures, and wherein the one or more attributes specify the one or more non-native architectures supported by the at least one node, the one or more non-native architectures being different than said native architecture; receiving by the resource manager a request to be processed by the heterogeneous computing environment, the request having specific resource requirements associated therewith; selecting by the resource manager at least one processing node of the plurality of nodes to process the request, the selecting including: determining which one or more nodes of the plurality of nodes have a native architecture compatible with the specific resource requirements of the request or support, as indicated by the obtained one or more attributes, a non-native architecture compatible with the specific resource requirements of the request; and choosing from those one or more nodes that have a compatible native architecture or support a compatible non-native architecture the at least one processing node to process the request; and allocating one or more resources of the at least one processing node to the specific request to process the specific request.

Thus, in accordance with an aspect of the present invention, a resource manager obtains one or more attributes of at least one node that indicate one or more non-native architectures supported by the at least one node. The resource manager also receives a request to be processed, and selects at least one processing node of the plurality of nodes to process the request. The selecting determines which of the nodes have either a native

architecture or support, as indicated by the obtained one or more attributes, a non-native architecture compatible with the specific request, and chooses from those nodes at least one processing node to process the request. At least one or more of these features is not described, taught or suggested in Ota or Bond, either alone or in combination.

Neither Ota nor Bond describes a technique for selecting from a plurality of nodes one or more nodes that are to process a specific request, wherein the selecting determines which nodes have a native architecture compatible to the request or support a non-native architecture compatible to the request, and then chooses from those nodes at least one node to process the request. Instead, Ota teaches how to convert an instruction set of one architecture into an instruction set of another architecture using the same hardware of a particular processor, and Bond teaches emulation of the kernel of a non-native operating system. Both of these references are at a different level than what is being claimed by applicants. Both are specifically describing how to process in a non-native architecture. However, neither of the references, either alone or in combination, teaches or describes applicants' claimed invention.

For example, neither Ota nor Bond, either alone or in combination, teaches applicants' claimed element of selecting by the resource manager at least one processing node of the plurality of nodes to process the request, the selecting comprising: determining which one or more nodes of the plurality of nodes have a native architecture compatible with the specific resource requirements of the request or support, as indicated by the obtained one or more attributes, a non-native architecture compatible with specific resource requirements of the request, and choosing from those one or more nodes that have a compatible native architecture or support a compatible non-native architecture the at least one processing node to process the request. Again, there is no discussion in either of the references of selecting which processor(s) of a plurality of processors is to process a particular request; and further, there is no discussion of applicants' claimed selecting element. Thus, at least these features of applicants' claimed invention are not described, taught or suggested in Ota or Bond, either alone or in combination.

Further, applicants respectfully submit that the combination of Ota and Bond also fails to describe, teach or suggest applicants' claimed element of obtaining by a resource

manager one or more attributes of at least one node, wherein the at least one node has a native architecture and supports one or more non-native architectures, and the one or more attributes specify the one or more non-native architectures supported by the at least one node. While Ota and Bond describe conversion/emulation for a non-native architecture/non-native operating system, there is no description, teaching or suggestion of a resource manager obtaining attributes of at least one node, wherein those attributes specify the one or more non-native architectures supported by the at least one node. This is not described, taught or suggested in Ota or Bond, either alone or in combination.

For at least the above reasons, applicants respectfully submit that the combination of Ota and Bond fails to render obvious applicants' claimed invention. Therefore, applicants respectfully request an indication of allowability for independent claim 1.

Further, the other independent claims are patentable for the same reasons as independent claim 1. For instance, each of the independent claims recite at the very least the following elements, which are not taught or suggested by the combination of Ota and Bond:

obtaining, by a resource manager of the heterogeneous computing environment, one or more attributes of at least one node of the plurality of nodes of the heterogeneous computing environment, the at least one node having a native architecture and supporting one or more non-native architectures, and wherein the one or more attributes specify the one or more non-native architectures supported by the at least one node, said one or more non-native architectures being different than said native architecture; and

selecting by the resource manager at least one processing node of the plurality of nodes to process the request, the selecting comprising:

determining which one or more nodes of the plurality of nodes have a native architecture compatible with the specific resource requirements of the request or support, as indicated by the obtained one or more attributes, a non-native architecture compatible with the specific resource requirements of the request; and

choosing from those one or more nodes that have a compatible native architecture or support a compatible non-native architecture the at least one processing node to process the request.

Thus, applicants respectfully submit that the independent claims are patentable over the combination of Ota and Bond, and therefore, respectfully request an indication of allowability for those claims.

The dependent claims are patentable for the same reasons as the independent claims, as well as for their own additional features. The additional art, Michaelis, does not overcome the deficiencies of the combination of Ota and Bond. Therefore, applicants respectfully request an indication of allowability for all dependent claims.

For at least the above reasons, applicants respectfully submit that their invention is patentable over the cited references, and respectfully request an indication of allowability for the pending claims.

Applicants respectfully request a telephonic interview with the Examiner at the time the Examiner considers this Response, if the Examiner continues to have concerns over the claimed invention. An Applicant Initiated Interview Request Form is included herewith.

Respectfully submitted,

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Dated: January 14, 2011

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